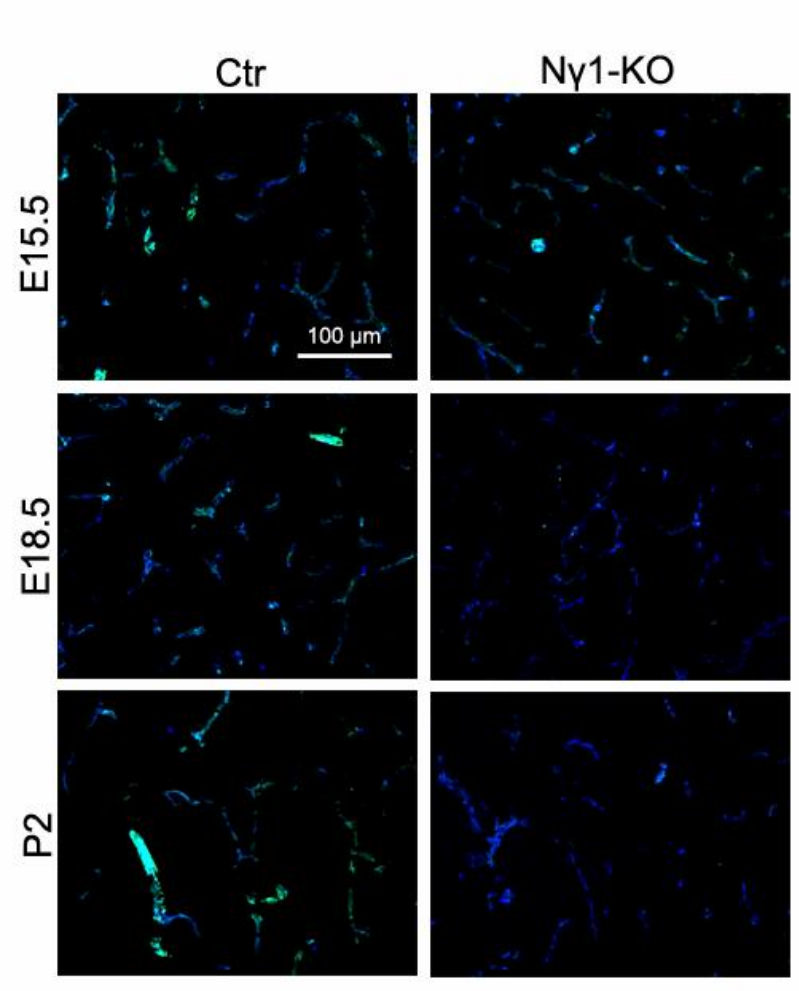
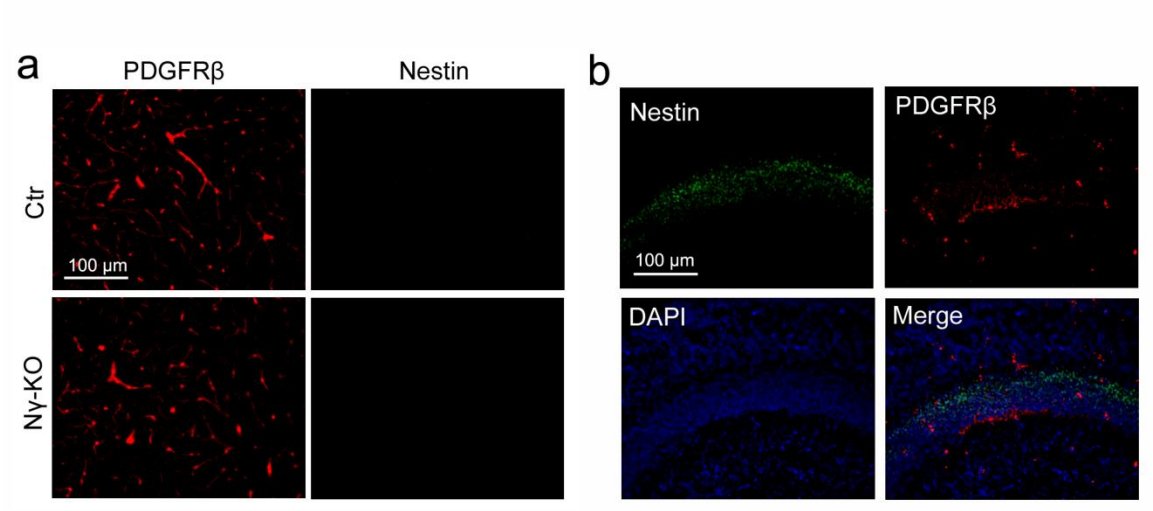
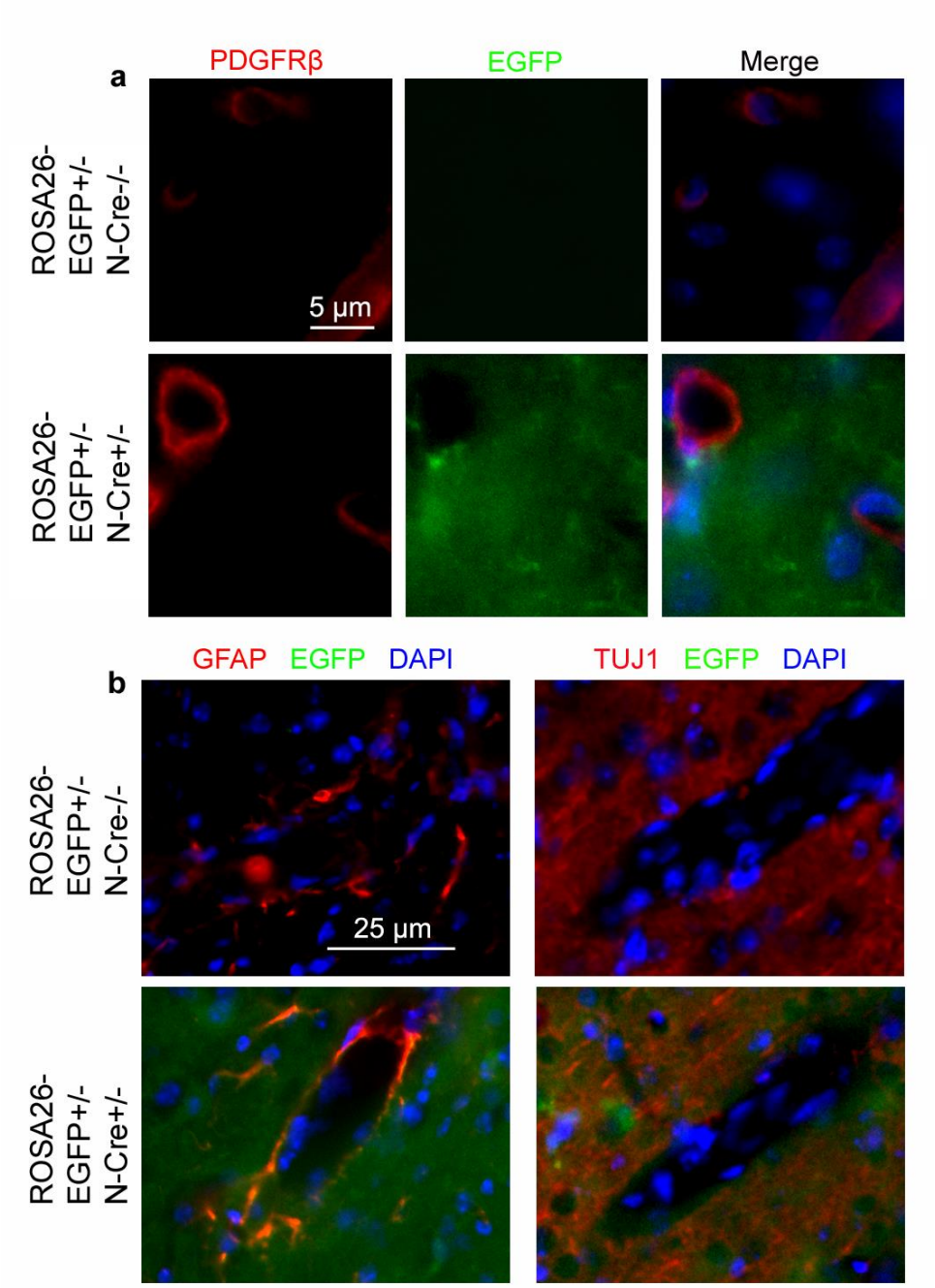


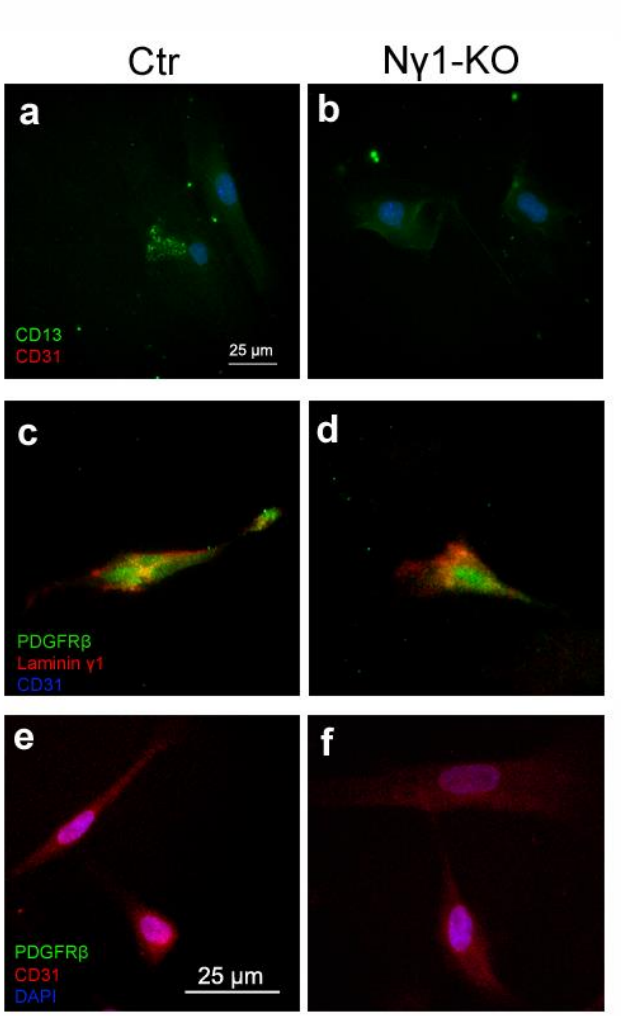
Supplementary Figure 1. Laminin γ1 expression is abrogated in Nγ1-KO mice at late embryonic stage. Immunohistochemical analysis shows that laminin γ1 expression is unaffected in Nγ1-KO brains at E15.5, but dramatically decreased at E18.5 and P2. Scale bar represents 100 μm.



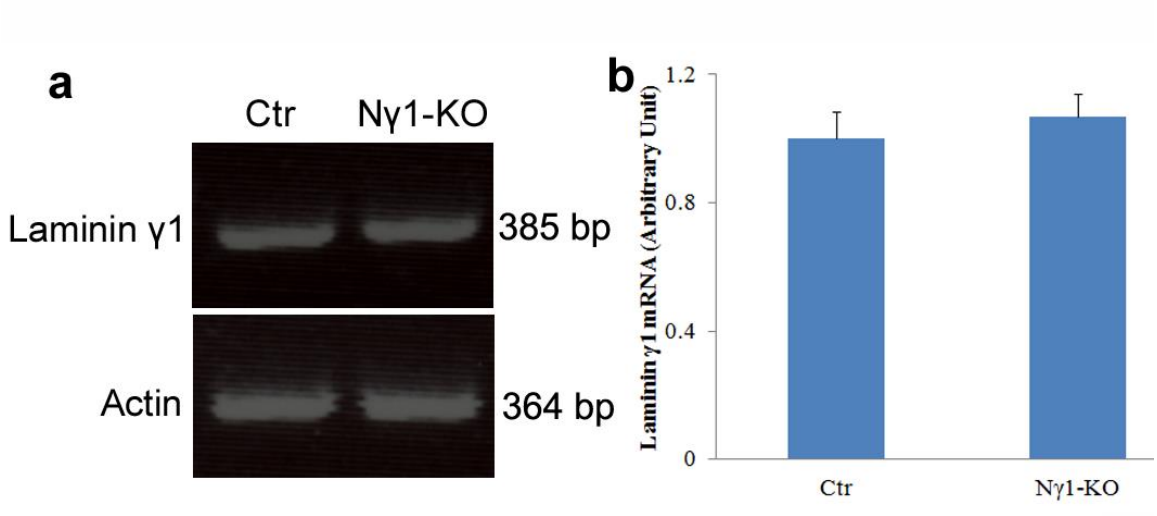
Supplementary Figure 2. Nestin is not expressed in pericytes in the striatum of Nγ1-KO mice. Immunohistochemical analysis shows that pericytes in Ctr and/or Nγ1-KO brains are nestin negative (**a**). Nestin labels neural stem cells in the subgranular zone (positive Ctr for the nestin antibody) (**b**). Scale bars represent 100 µm.



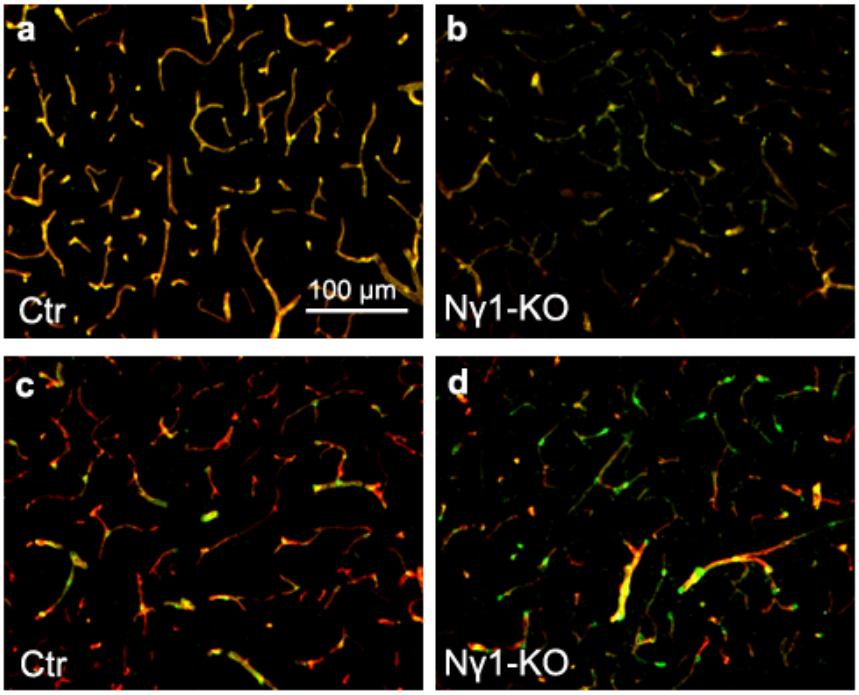
Supplementary Figure 3. Cre is not expressed in pericytes of Nγ1-KO mice. Immunohistochemical analysis shows that EGFP (green) is expressed in PDGFRβ (red) negative cells in ROSA26-EGFP$^{+/-}$ Nestin-Cre$^{+/-}$ mice (**a**), but is completely absent in ROSA26-EGFP$^{+/-}$ Nestin-Cre$^{-/-}$ Ctr mice (**a**). EGFP co-localizes with GFAP and TUJ1 in the abluminal side of blood vessels (**b**). Scale bars represent 5 μm (**a**) and 25 μm (**b**).



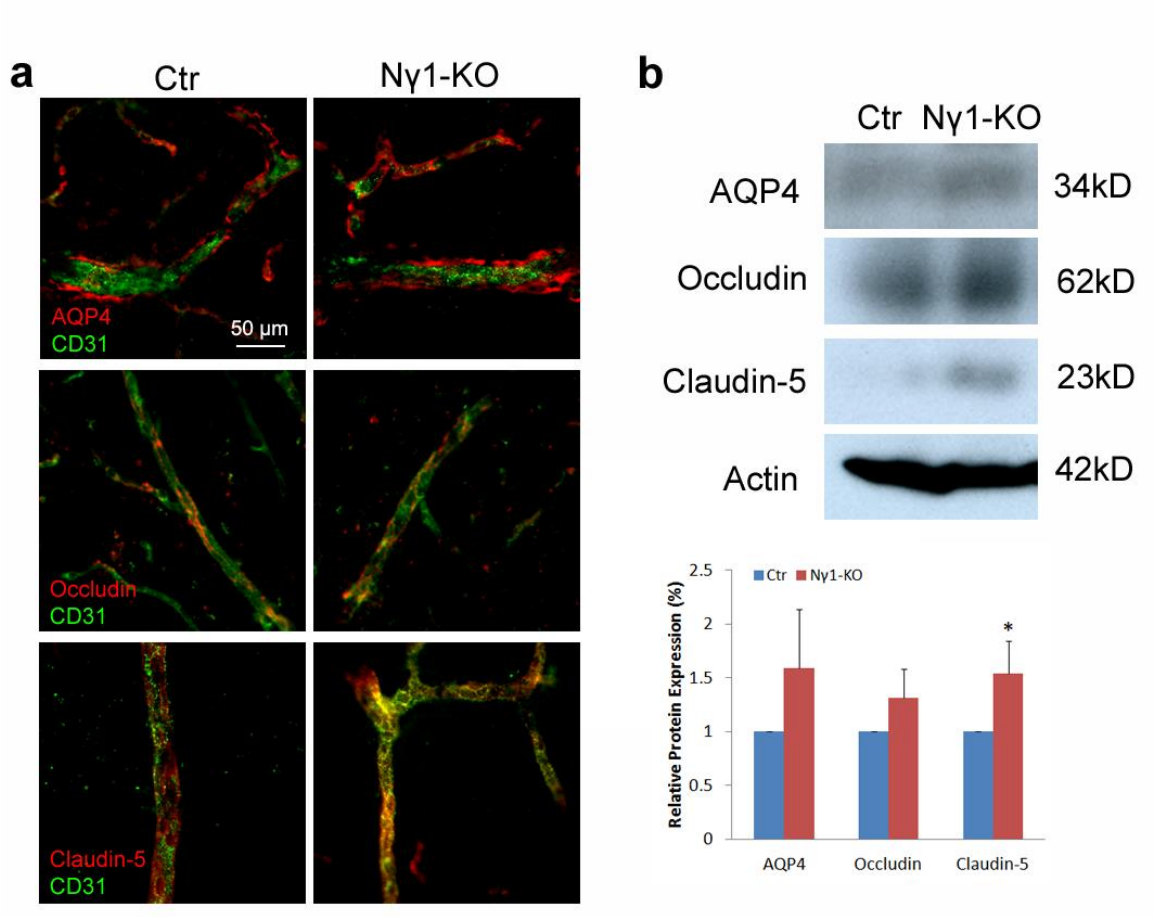
Supplementary Figure 4. Laminin γ1 expression is not affected in primary pericytes from Nγ1-KO brains. Immunocytochemical analysis shows that primary pericytes from Ctr and Nγ1-KO brains are CD13 (**a** and **b**) and PDGFRβ (**c** and **d**) positive, but CD31 negative (**a**-**d**). These cells are also laminin γ1 positive (**c** and **d**). Primary brain capillary endothelial cells are CD31 positive and PDGFRβ negative (**e** and **f**). **a** and **c**: Ctr pericytes; **b** and **d**: Nγ1-KO pericytes. **e**: Ctr endothelial cells; **f**: Nγ1-KO endothelial cells. Red: CD31 (**a**, **b**, **e** and **f**) and laminin γ1 (**c** and **d**), Green: CD13 (**a** and **b**) and PDGFRβ (**c**-**f**), Blue: DAPI (**a**, **b**, **e** and **f**) and CD31 (**c** and **d**). Scale bars represent 25 µm.



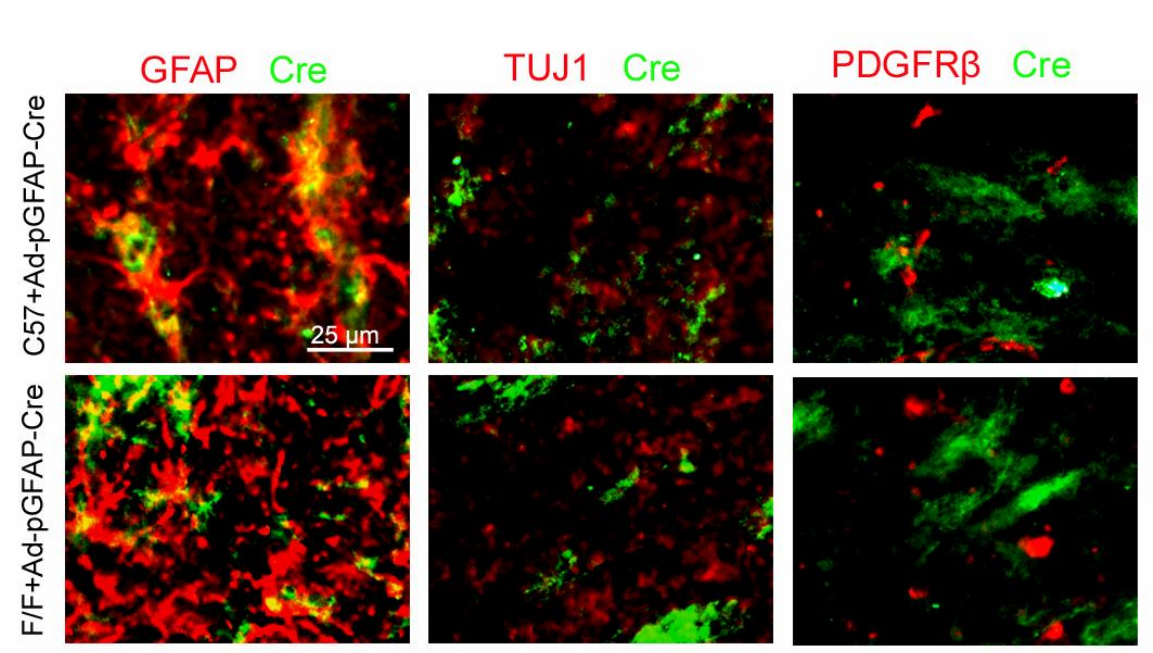
Supplementary Figure 5. Laminin γ1 mRNA is not affected in primary pericytes from Nγ1-KO brains. (**a**) PCR shows amplification of laminin γ1 in primary pericytes from Nγ1-KO mice. Actin was used as a Ctr. Full blots of laminin γ1 and actin are shown in Supplementary Figure 14**g**. (**b**) Quantification of laminin γ1 mRNA level in Ctr and Nγ1-KO primary pericytes by qRT-PCR. The expression level in Nγ1-KO pericytes was normalized to that in Ctr pericytes (n=5). Data are shown as mean ± sd.



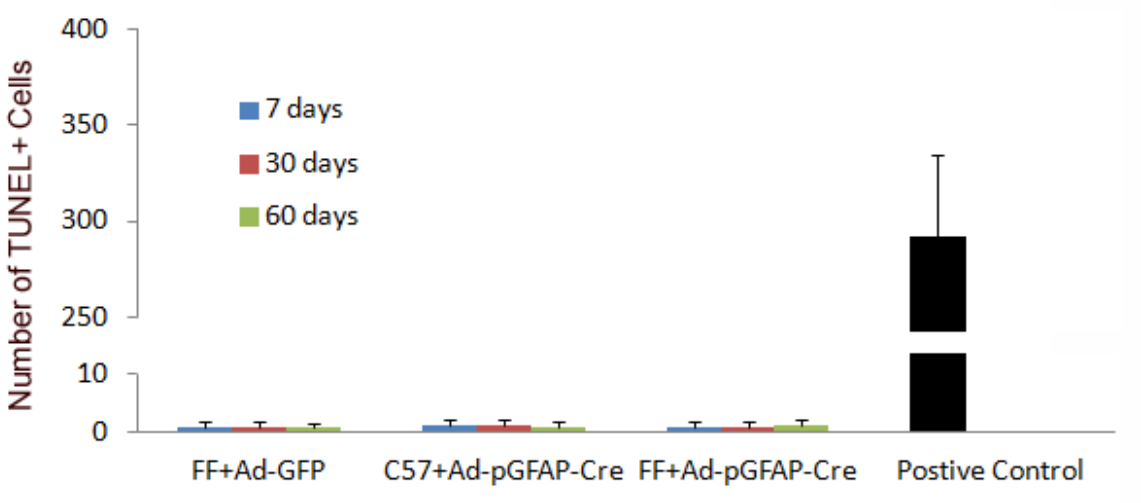
Supplementary Figure 6. Pericytic laminin expression is not affected in the Nγ1-KO mouse line. Immunohistochemistry analysis shows that laminin-α2 co-localizes with pericyte markers CD13 (**a** and **b**) and PDGFRβ (**c** and **d**). **a** and **c**: Ctr brains; **b** and **d**: Nγ1-KO brains. Red: Laminin-α2, Green: CD13 (**a** and **b**) and PDGFRβ (**c** and **d**). Scale bar represents 100 µm.



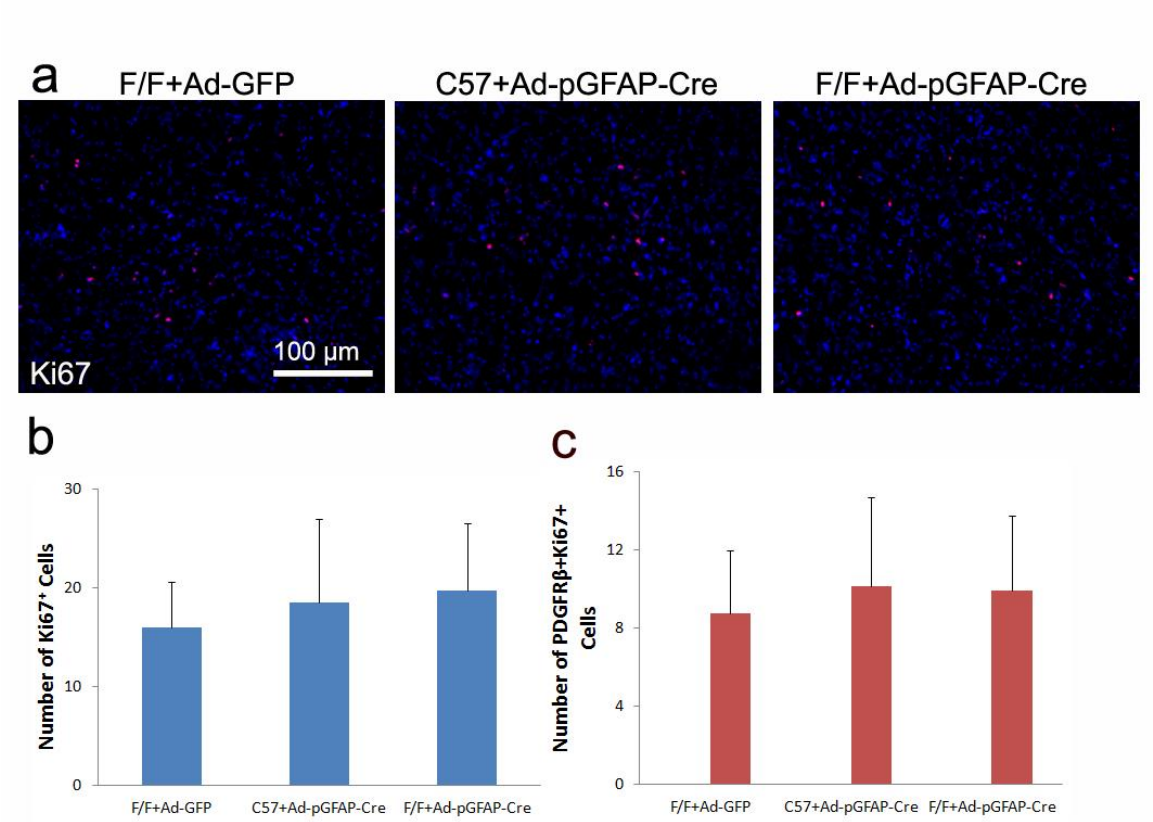
Supplementary Figure 7. AQP4 and tight junction proteins are not affected in large blood vessels in Nγ1-KO mice. (**a**) Immunohistochemistry analysis shows that the expression of AQP4, occludin and claudin-5 was not reduced in large blood vessels in Nγ1-KO mice. (**b**) Quantitative western blots using large brain vessels showed that AQP4 and occludin levels were not affected, whereas claudin-5 was increased in Nγ1-KO mice. Full blots of these AQP4, occludin, claudin-5, and actin are shown in Supplementary Figure 14**h**. All bands were normalized to actin (n=4). Data are shown as mean ± sd. *p<0.05 versus the Ctr by student's t-test. Scale bar represents 50 μm.



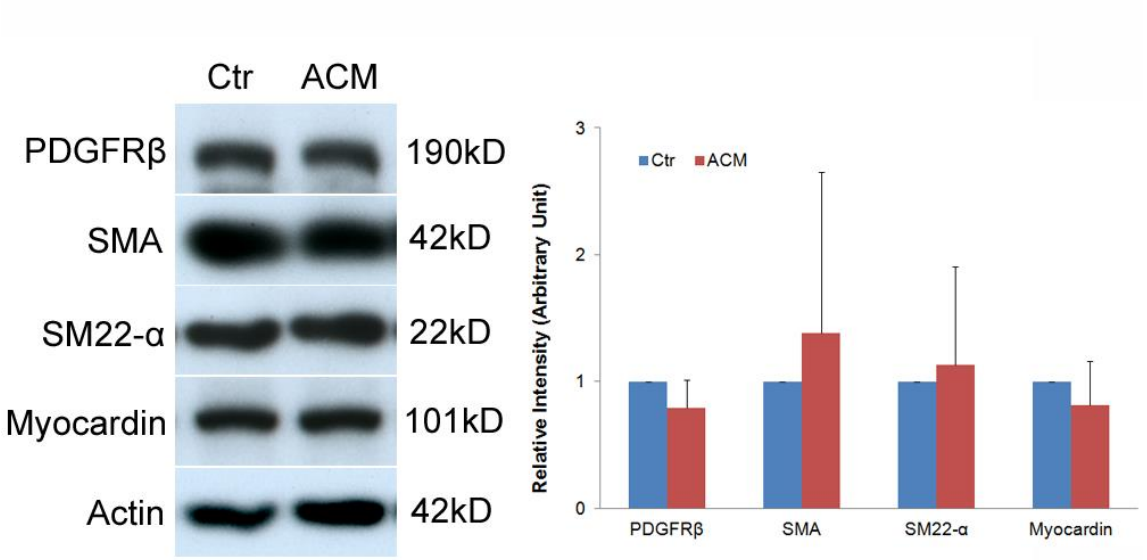
Supplementary Figure 8. Cre is specifically expressed in astrocytes after injection of Ad-pGFAP-Cre. Mouse brains were collected seven days after adenoviral injection and subjected to immunohistochemical analysis. In both C57 and F/F mice, Cre co-localizes with astrocyte marker GFAP, but not neuronal marker TUJ1 or pericyte marker PDGFRβ. Scale bar represents 25 μm.



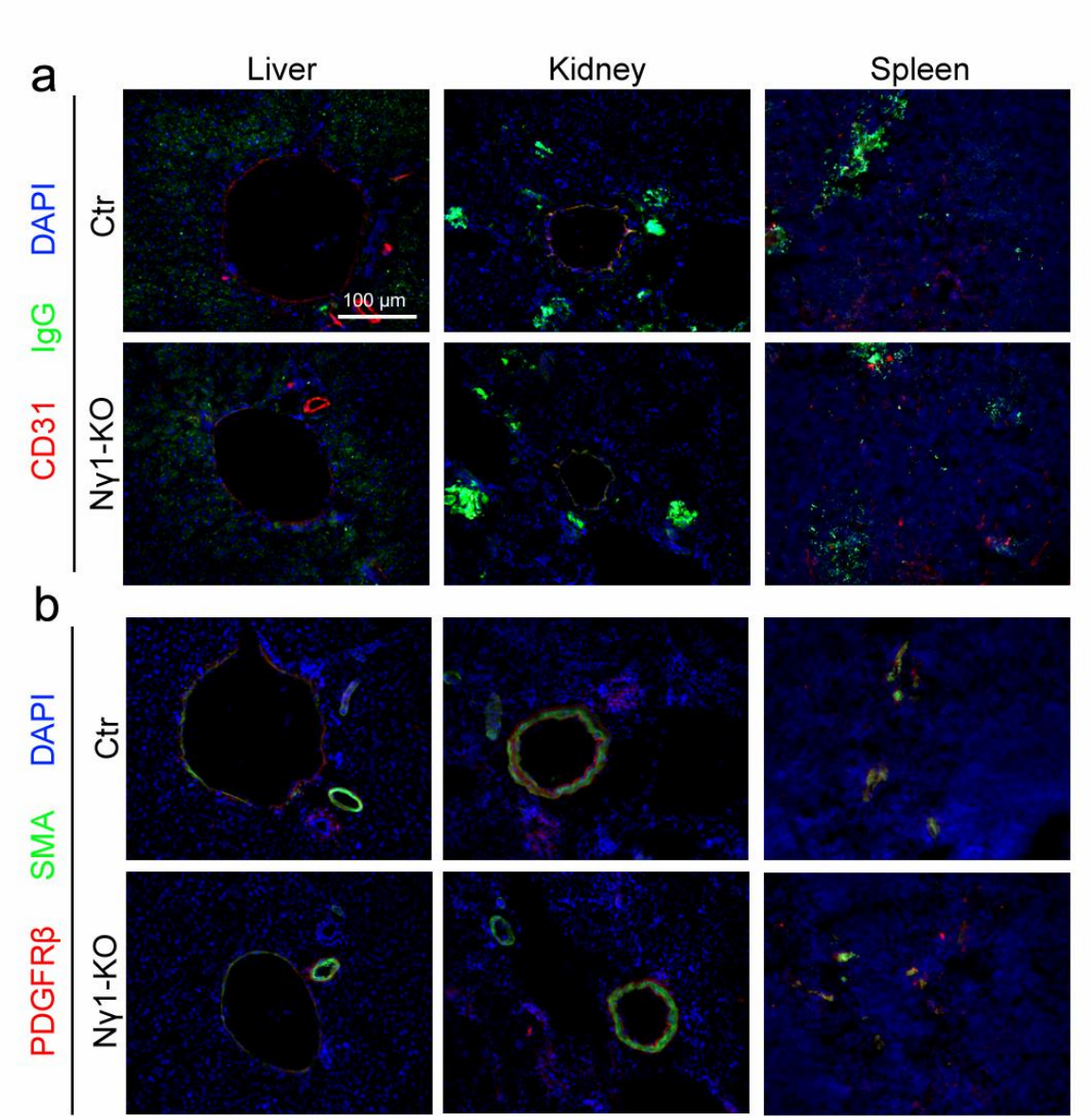
Supplementary Figure 9. Injection of adenoviruses does not cause apoptotic cell death. Seven, thirty, and sixty days after adenoviral injection, mouse brains were collected and subjected to TUNEL assay. Neglected numbers of TUNEL-positive cells were observed in either astrocytic laminin knockdown brains (F/F+Ad-pGFAP-Cre) or the controls (F/F+Ad-GFP and C57+Ad-pGFAP-Cre). Brain sections pre-treated with recombinant DNase I (positive control) showed a large number of TUNEL-positive cells. Data were quantified using 9 random sections from at least 3 mice per group. Data are shown as mean ± sd.



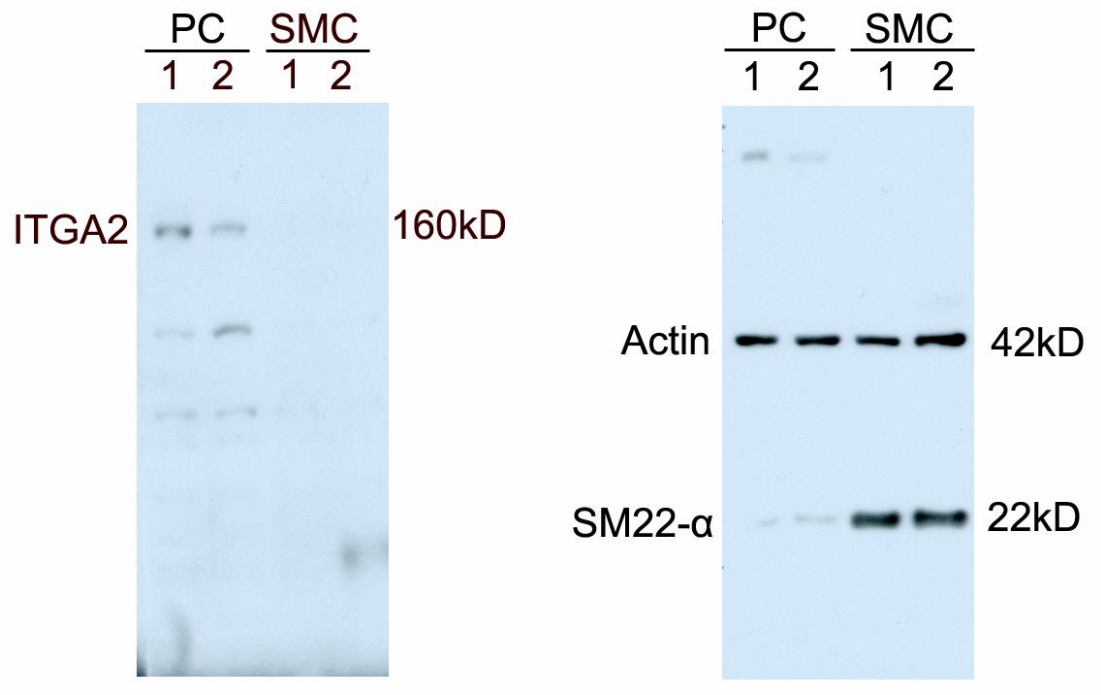
Supplementary Figure 10. Acute ablation of astrocytic laminin does not affect proliferation *in vivo*. Seven days after adenoviral injection, mouse brains were collected and analyzed. (**a**) Immunohistochemistry analysis shows that adenovirus-induced astrocytic laminin knockdown does not affect proliferation. (**b**) Quantification of total Ki67+ cells. (**c**) Quantification of Ki67+PDGFRβ+ cells. Data were quantified using 9 random sections from at least 3 mice per group. Scale bar represents 100 μm. Data are shown as mean ± sd.



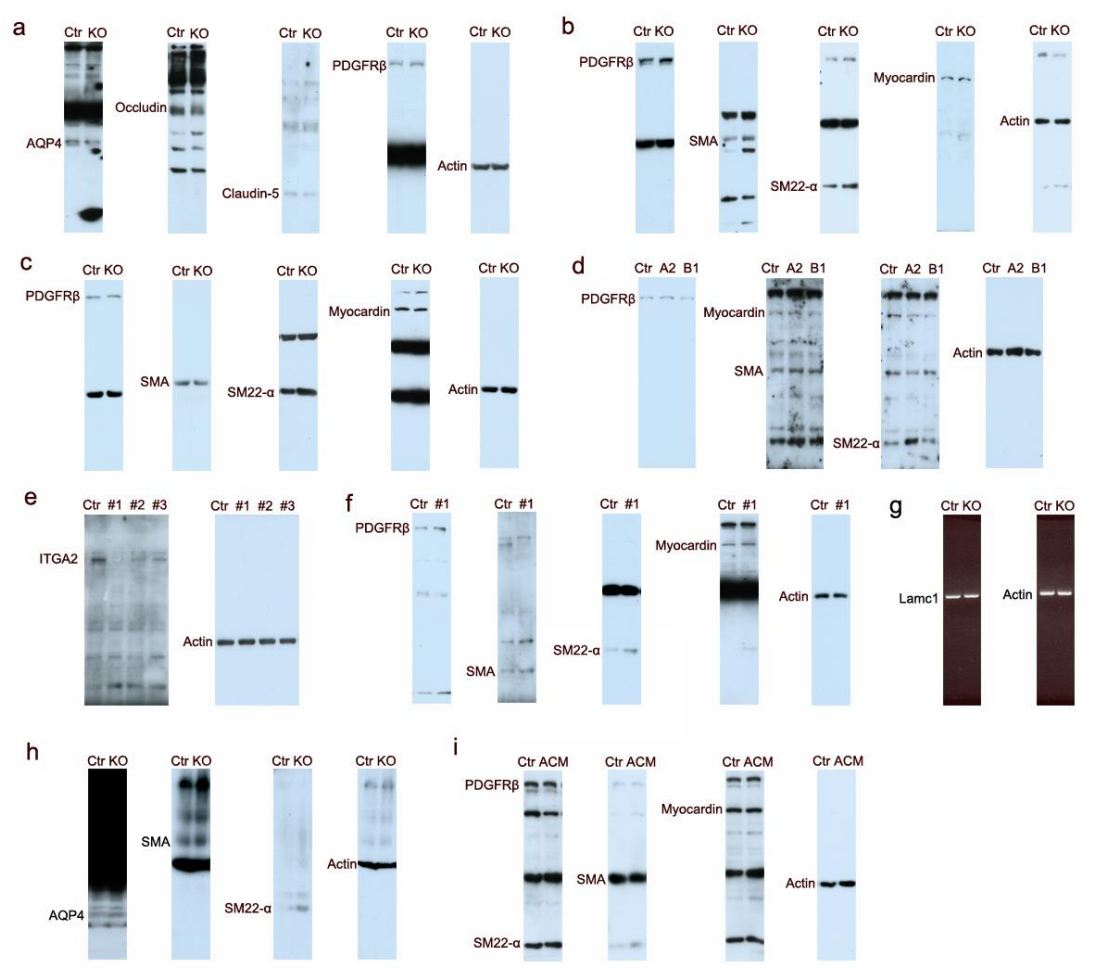
Supplementary Figure 11. Astrocytes-secreted soluble factors do not affect pericyte differentiation. Immunoblots show that conditioned medium from astrocytes does not affect the expression of PDGFRβ, SMA, SM22-α, or myocardin. Fresh medium was used as a Ctr. Full blots of these proteins are shown in Supplementary Figure 14**i**. All bands were normalized to actin (n=6). Data are shown as mean ± sd.



Supplementary Figure 12. Capillary leakage and pericyte differentiation in Nγ1-KO mice are brain specific. Immunohistochemistry shows similar levels of IgG between Ctr and Nγ1-KO mice in liver, kidney and spleen (**a**). No difference in the expression of SMA in PDGFRβ positive pericytes was observed between Ctr and Nγ1-KO mice in these peripheral organs (**b**). Scale bar represents 100 μm.



Supplementary Figure 13. ITGA2 is expressed in pericytes but not in vascular smooth muscle cells. ITGA2 bands were found in pericyte lysates but absent in vascular smooth muscle cell lysates. SM22-α was observed in both lysates, but at much higher levels in vascular smooth muscle cells. Actin was used as loading control. PC: pericytes, SMC: vascular smooth muscle cells.



Supplementary Figure 14. Full size images of the blots. (**a**) Full blots for Figure 2c. (**b**) Full blots for Figure 6a. (**c**) Full blots for Figure 6b. (**d**) Full blots for Figure 7a. (**e**) Full blots for Figure 7c. (**f**) Full blots for Figure 7d. (**g**) Full blots for Supplementary Figure 5a. (**h**) Full blots for Supplementary Figure 7b. (**i**) Full blots for Supplementary Figure 11. Ctr: control, KO: Nγ1-KO, A2: integrin α2 blocking antibody, B1: integrin β1 blocking antibody, #1,2,3: integrin α2 knockdown #1,2,3, ACM: astrocyte conditioned medium.